# TUBERCLE

# AND UNDERWEAR,

BY

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Physician to the French Hospital; Assistant Physician to the Metropolitan Hospital.

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THE strength of tuberculosis resides largely in its power of successful masquerade. It masquerades in general, and it masquerades in particular. It masqueraded for centuries as the child of cold and damp, and succeeded to such good purpose that it established itself as one of the greatest destructive powers on this planet. It succeeds to-day in gaining invaluable time by successfully masquerading, even before the eyes of keen and trained observers, as some transient and harmless malady. It deceives the physician, it deludes the surgeon; above all, it hoodwinks the hygienist.

The hygienist is one who is versed in the science of the preservation of health. Him the demon of tuberculosis has persuaded that the most suitable underwear for people in general, and for the tuberculous in particular, is the material, namely, flannel or wool, which of all others is the least conducive to health, and the most favourable to the development and progress of tubercle. And yet the hygienist is not easily deceived. In the last few decades, by his methods of scientific experiment and patient observation, he has read the secret of several dread diseases. He has beaten smallpox and typhus, he has exposed enteric; and malarial fever he has triumphantly tracked to its lair among the swamps. Nevertheless, tubercle remains his master: to the extent even of causing him to advocate, obstinately and even aggressively, a custom which, on grounds both theoretical and practical, is grossly, ridiculously, and demonstrably wrong. Let us see.

The two main functions of the skin are generally considered to be the preservation of the heat equilibrium and the excretion of certain effete matters in the form of fluid or watery vapour. Assuming that this view of the matter is correct, and assuming also that clothing of some kind is essential to dwellers in the temperate zone, it follows that, of such clothing, the portion to be worn next the skin should be endowed with the two properties which will best assist in the performance of the two principal cutaneous functions. The material should, in fact, be warm and absorbent.

In the temperate zones people suffer from extremes of cold, rarely from extremes of heat. Underwear should therefore be warm. No material is "warm" *per se*. The warmth is necessarily derived from the body, so that a warm material is merely one which does not allow the heat to escape rapidly, a material which is, in short, a bad conductor. Atmospheric

air being one of the worst conductors of heat, from this point of view, a very suitable material is one which is so constructed as to imprison a considerable portion of atmospheric air in its meshes.

The excrementitious fluids and vapours which are constantly being given off from the skin should, like all other excrementitious matter, be removed as soon as possible from the cutaneous surface. To this end, it is essential that underwear should be absorbent, and absorbent in a very high degree. If it is not, not only does the excrementitious fluid remain in contact with the skin to irritate it, but the layer of atmospheric air which lies between the garment and the skin itself, rapidly becomes surcharged with moisture and excreted gases. However tightly-fitting the garment may be, there is always this layer of atmospheric air between it and the skin, and the skin, be it remembered, is a respiratory organ.

So much is generally conceded ; the theoretical propositions are, indeed, beyond dispute. It is only when we come to their practical application that the machinations of the demon of tubercle become apparent. This demon has decreed that flannel or wool (they are the same thing) shall be considered to be the proper material for underwear, and, further, that he who thinks otherwise shall be deemed unorthodox—either a fool or a faddist. Of the two properties essential to wholesome underwear—warmth and the power of absorption—flannel possesses one only, namely, warmth. Of the other, superficially the less attractive, but hygienically infinitely the more important, namely, a high degree of absorptive power, it possesses little or none at all. The demon, however, has contrived to sit at the elbow of all the writers of all the text-books on the subject, and has mesmerised them into applying the adjective "hygroscopic" to this material. Had they not been mesmerised,

it is certain that these authorities, some of them at any rate, would have tested the truth of this claim. A very simple experiment would have shown them its falsity and proclaimed the danger to which its acceptance exposes the credulous.

If a piece of flannel is placed on water, it will float for hours before it sinks; indeed, if the flannel be "new," unless the water be agitated, it will not sink at all. Compare this with the behaviour in the same circumstances of a piece of linen, or cotton, or silk. The kerchief made of any of these materials sinks immediately, showing that its absorptive power is infinitely greater than that of flannel. And yet the latter is authoritatively described as "hygroscopic." If the believers in its possession of this property were to substitute a flannel for a linen pocket-handkerchief the next time they suffer from a cold in the head, the experience would probably suggest some more homely adjective. Except in comparison with mackintosh-sheeting

and zinc-roofing, flannel is not hygroscopic; in comparison with linen, or cotton, or silk, it is conspicuously and essentially devoid of absorptive power. This refers to new flannel. The washing process to which under-garments are subjected causes flannel to shrink. This means that the air-spaces to which the material owes its "warmth" are gradually abolished by the attentions of the washerwoman, so that a piece of old flannel is neither "warm" in the above sense nor absorbent. From the standpoint of hygienic underwear it has now become not only partly, but wholly and actively, deleterious; a garment made of newspaper could hardly be more so.

In the light of these considerations, the effects of wearing flannel or wool in contact with the skin are not very difficult to estimate. The excrementitious moisture which is constantly being given off from the cutaneous surface

cannot find that exit which Nature intended it to find, and it is consequently imprisoned in the layer of atmospheric air which lies between the garment and the skin. This layer, accordingly, rapidly becomes impure and moist. Setting aside the respiratory function of the skin, whose importance, though admitted in theory, is invariably hastily brushed aside as soon as any question of underwear is concerned, it is pertinent to inquire what effect this layer of moist and impure air is likely to exercise upon the two cutaneous functions whose importance is commonly regarded as paramount.

And first as to the heat-regulating function. Whatever the variations in the temperature of the surrounding medium, the body is normally maintained at the uniform temperature of 98·4° F. by means of corresponding variations in the contraction and dilatation of the vessels in the integument. To a cold influence they

contract, so as to prevent undue loss of heat; to a warm influence they relax, so as to favour evaporation and radiation. The layer of warm moist air which flannel imprisons against the skin seriously interferes with this process, for the cutaneous vessels are in a continual state of undue relaxation; they are being subjected to the same influence as a poultice exerts, and do not therefore contract adequately to a cold influence. That is the reason why flannel-wearers always complain so bitterly of the cold, their pathetically futile remedy for which is to multiply the number of garments of the very material which is the cause of their miseries.

From the point of view of tubercle, both actual and potential, this has a very serious bearing. The tuberculous poison is a powerful vaso-dilator, so that the practice of wearing flannel imitates closely the results which the bacillus itself seeks to effect: results which are therefore presumably the most advantageous to

its development. But vaso-dilation means low blood-pressure, and low blood-pressure spells physical lassitude and mental lethargy. In the case of the young, this inevitably leads to defective development, and both in young and mature it provides a fitting nidus for any pathogenic germ which may be watching its opportunity.

The poultice-like effect of wearing flannel induces an enormous excess of cutaneous secretion, and here again we find a very close imitation of the behaviour of the tuberculous poison. In France they recognise that in the case of the potentially tuberculous the great thing to avoid is demineralisation of the tissues, a process which is immensely favoured by the undue activity of the sweat-glands, for which the wearing of flannel is responsible.

The disinclination, however, of the mesmerised hygienist to discuss the question of the skin as a

respiratory organ should not prevent those who have escaped the mesmeric influence from looking the matter in the face. Everyone now admits the paramount importance of supplying fresh air in superabundance to the lungs, but where it is a question of the other, and the only other, respiratory organ, the matter of fresh air is considered of no account. The skin is, in point of fact, still treated as the lungs used to be treated in the presanatorium days, the days of the apotheosis of "warmth" and the neglect of purity. Where the skin is concerned the cry is still "warmth" at all hazards; purity is regarded as a fad and physiology as an academic study whose teachings can be considered only when they happen to be in consonance with the requirements of the thermal monster which a stiff-necked and ignorant generation has elected to worship. And this "warmth" which they affect to cultivate is precisely what the flannel-wearers never attain. Their relaxed

cutaneous vessels do not, because they cannot, respond to a cold influence, undue loss of heat is constantly occurring, and instead of treating their skins on rational physiological principles, instead of training them to respond promptly and adequately to external variations, they increase the dosage of the vessel-relaxing and health-destroying flannel. Is it any wonder that the children among them have adenoids and are rickety, or that the adults regard a "draught" as their deadliest enemy?

At the root of the enormous amount of educative work which still remains to be accomplished in the fight against tuberculosis lies the question of the hygiene of the skin. The flannel-wearer hates fresh air because it is cold, and so long as he remains a flannel-wearer he is powerless to react to cold influences. He therefore fights stubbornly and aggressively against the application in his own case of the principles of the open-air treatment. It is useless to try and

convince such a person that fresh air is his best friend. He knows by experience that it is not; whatever its theoretical merits may be, to him it means undue loss of heat and consequent physical miseries. If he is ever to be convinced it must be by way of his skin. When that is properly educated and rationally clothed, draughts will cease to have any terror for him. Until then, he will remain a convinced and militant obstacle to progress, inflicting overheated and polluted atmospheres upon every company in which he may find himself. Considering that, thanks to the demon of tuberculosis, the vast majority are flannel-wearers, what possible chance under existing conditions has the true gospel?

If this demon is to be cheated, the community must be purged of this preposterous heresy. The skin must be trained by cold baths and exposure to other cold influences adequately to perform its contractile duties. Underclothing must be

in consonance with physiological principles; that is, it must be warm, absorbent and ventilated. Nature did not intend us to live in hot houses, neither did she impose clothing upon us. If we would live healthfully and allow our children to develop normally we must revert to natural conditions so far as the exigencies of civilised life will permit us. The necessity for pure air is gaining recognition, but it will not carry us far until we have recognised the equal if not greater necessity for rational and physiological treatment of the skin. Linen, cotton, and silk under-garments can be made, and are made, so as to imprison air in their meshes. Such garments are every whit as warm as flannel, to which they are superior in their possession of those absorptive and ventilating properties of which flannel is so conspicuously devoid.

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